Service Manual

HumaStar 300

Cat.-No.: 17901S/2

CE

REVISION LIST OF THE MANUAL		
No.	DATE / Rev.	REVISION DESCRIPTION
1	01/2005-01	First edition
2	02/2005-08	Supplement: Technical diagrams

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Safety Note:
Analyzer may be contaminated with human material (blood, serum, plasma, urine etc.) Disinfect analyzer prior to servicing and wear gloves. Be aware of potential biohazardous risks!

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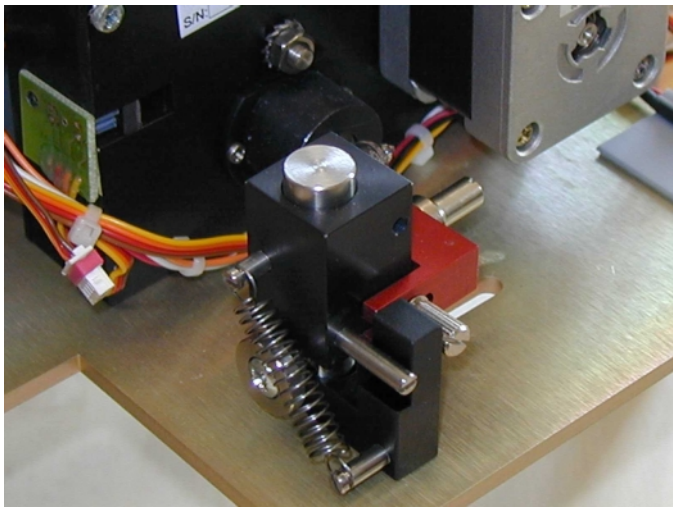
1. MECHANICAL ADJUSTMENTS

READING ASSEMBLY

THIS OPERATION should be done with the ANALYZER TURNED OFF

1. Remove the lamp holder Fig. 1A: detach the spring (1) and remove the whole lamp support (2).
2. Remove the photometer Fig. 1B : remove the screws (1) (hex key 3mm)
3. Remove the read window Fig.1C, remove the screws (1) (use Phillips screwdriver 5mm)
4. Unscrew the knob (2), remove the reference pin (3). Remove the reaction plate. (To remove the reaction plate use the reference pin by inserting it into one of the two holes (9)). Remove cuvette 38 (use the extractor tool D/1)
5. Tighten the screw (6) (hex key 10mm) to lock the disk (7). Insert the Friction Devise on the central axis on the side of the pulley Fig. 1E. and loosen the screws (4) of the pulley (2).
6. Adjust the belt tension: loosen the screw (2)(hex key 3mm) and the rotating screw (1) - (hex key 4 mm), rotate the support (3) - (counterclockwise) to obtain a deflection in the center of the belt of about 5 mm with a pressure of 0.5 -0.6 kg. (see 5 in Fig. 1D)
7. Lock the screws (1 and 2).
8. Install the reaction plate into its place in the incubation chamber, insert the locking pin and screw in the knob.
9. Insert the reference pin D/6 into the window seat (1) in Fig.1E and into the hole of cuvette 38.



10. Position the pulley (2) in Fig. 1E until the HOME Flag touches the device D4 in Fig. 1E.
11. Lock the screws (4) of the pulley (2) - (use hex key 3 mm), remove the friction device D/11, remove the device D6 and re-assemble in sequence: cuvette 38, the window in the incubation bath, photometer, lamp support and the spring.

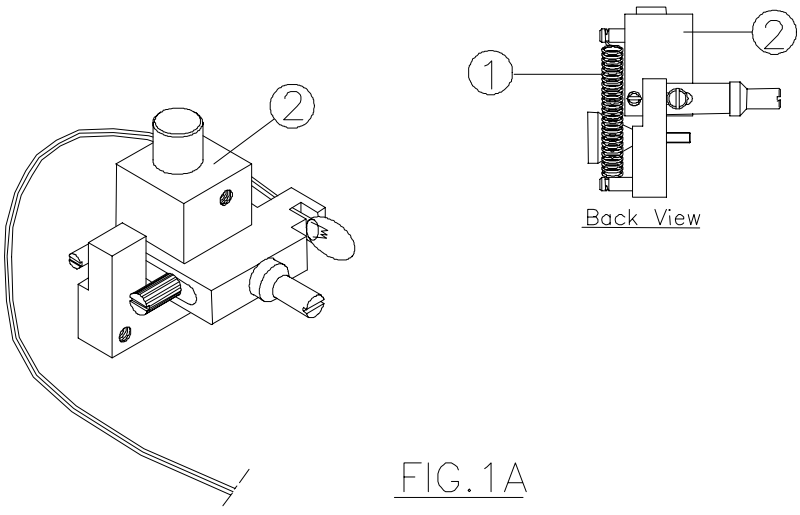


FIG.1A

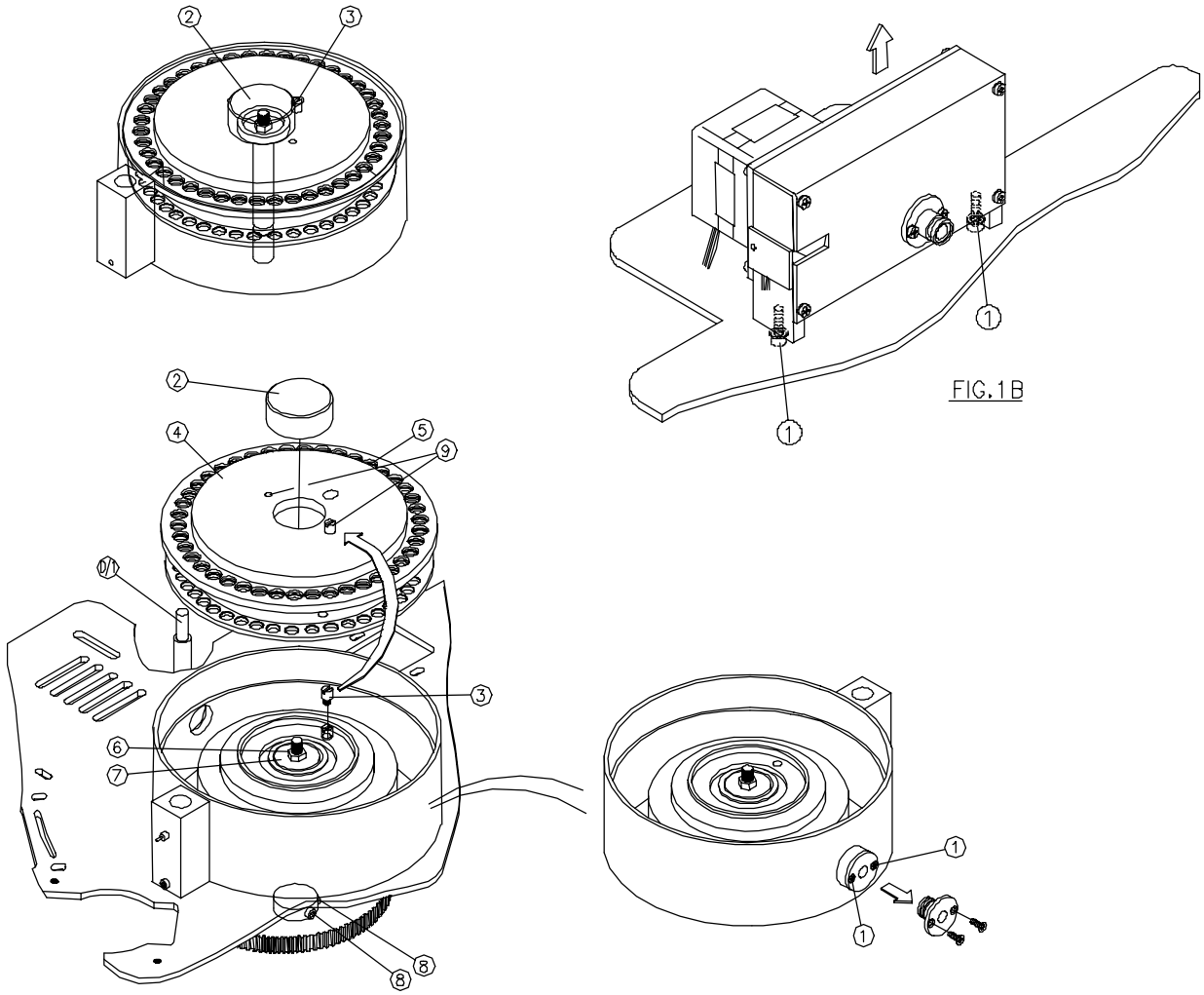
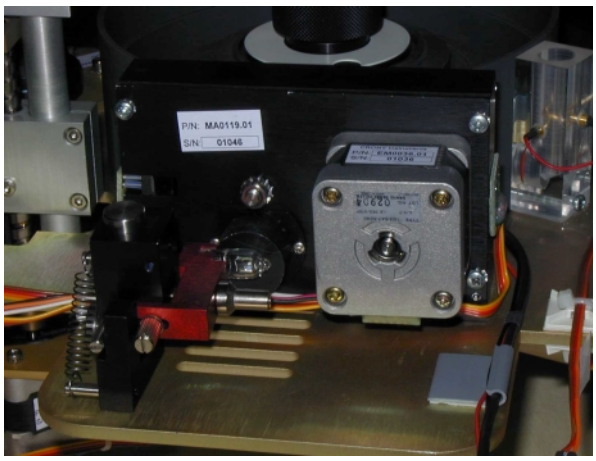
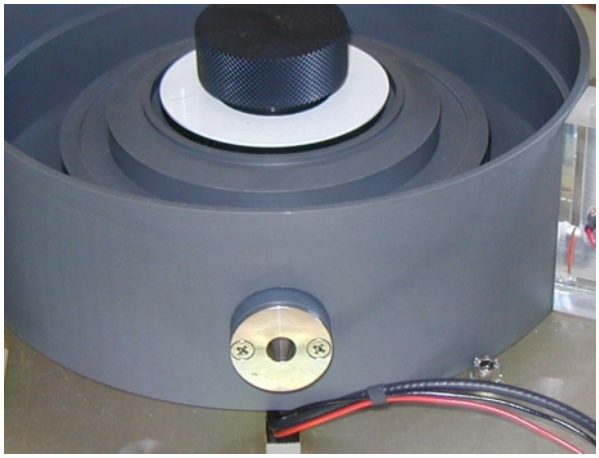


FIG.1B

FIG.1C





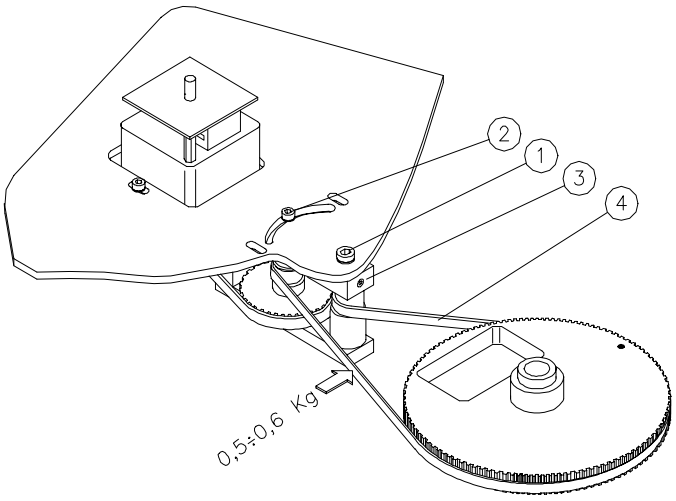


FIG.1D

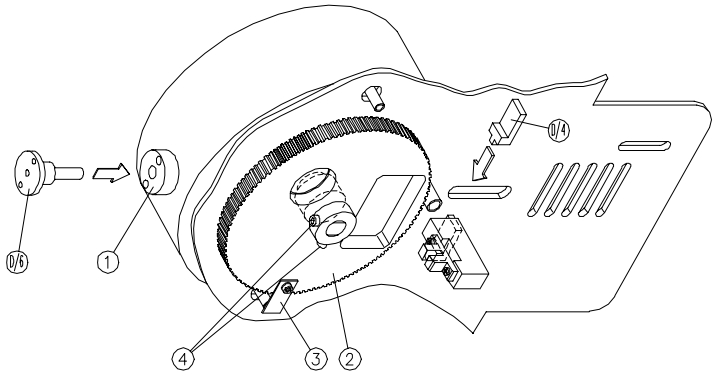
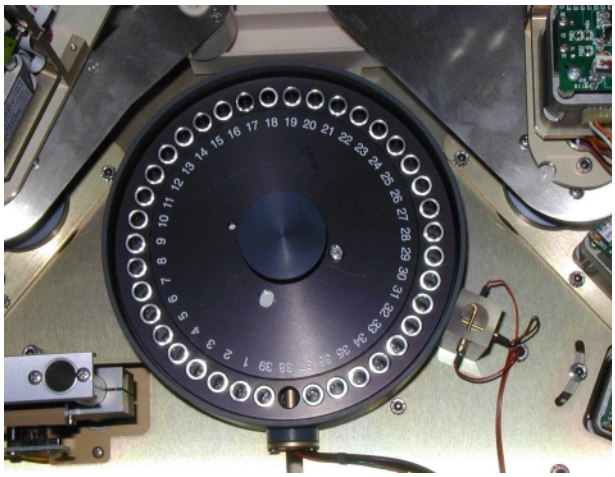
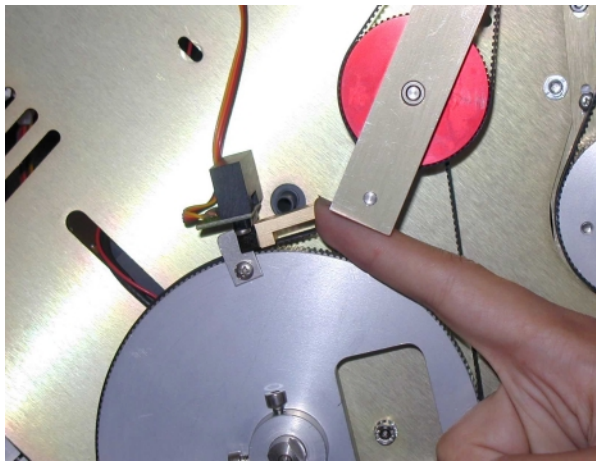


FIG.1E





SAMPLING ARM

VERTICAL MOVEMENT

1. Remove the PCB of the encoder (1) in Fig. 1F and replace it with the device D/8 to align the SYNC. (11) in Fig.1F.
2. Check all the screws of the pulley (3 and 4) in Fig. 1F and make sure that they are all well locked. (hex key 2 mm)
3. Bring the probe support to 5 mm from the top (12) in Fig. 1F -(use the spacer 2 mm D/3)
4. Rotate the encoder disk (2) until the hole of the SYNC is perfectly aligned with the reference device; lock the disk screw (13) (hex key 1.5 mm. Make sure not to tighten too strongly since the support is made in PVC) Reinsert the PCB of the encoder and lock the screws (5).

ROTATIONAL MOVEMENT

1. Remove the PCB of the encoder (6) and replace it with the device D/8 to align the SYNC (11) in Fig. 1F.
2. Insert into cuvette 17 or 20 the adapter device D/2, loosen the screws of the pulley (8) in Fig.1F.
3. Position the PROBE (Sample Reagent) perfectly perpendicular on the opening of cuvette 17 or 18,
4. Introduce the Probe declogger D/7 into the probe holder. ("A5" L=205; "S300" L=178) and rotate the pulley (8) in Fig.1F to align the flag HOME to the center of the OPTO (15) in Fig.1F.- lock the screws (14) of the pulley (8).
5. Rotate the cam (9) in Fig. 1F - (plain screwdriver 2.5 mm) and verify that the probe rotates inside the perimeter of the hole of the adapter.
6. Hold the ARM fixed and rotate the disk (7) until the hole of the SYNC (11) is perfectly aligned with the hole of device D/8 in Fig. 1F.
7. Lock the screws (14) of the disk (use hex key 1.5mm - Make sure **not to lock the screw too tightly** since the support is made in PVC)
8. Reinsert the PCB of the encoder and lock the screws (10).

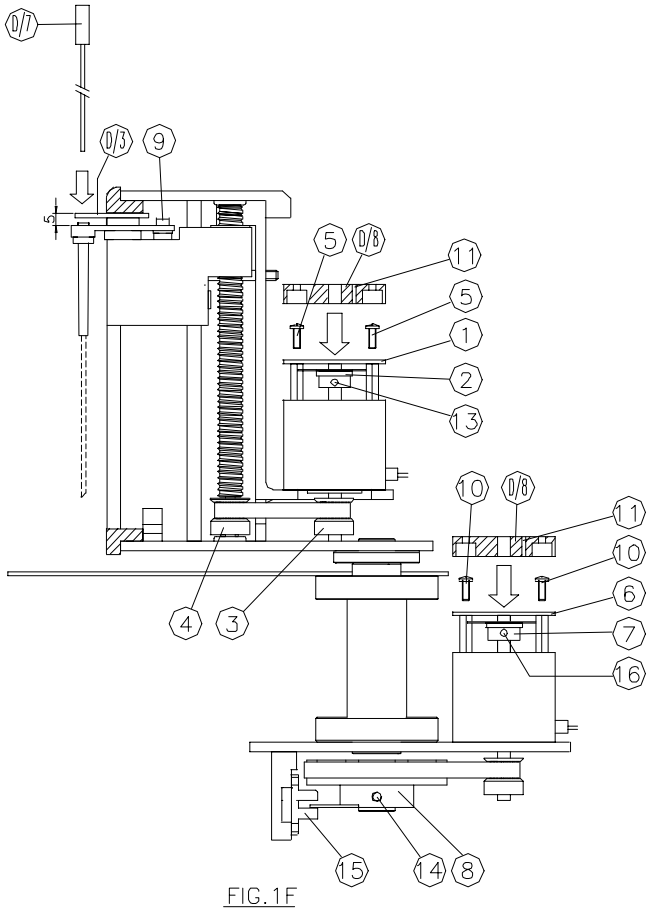
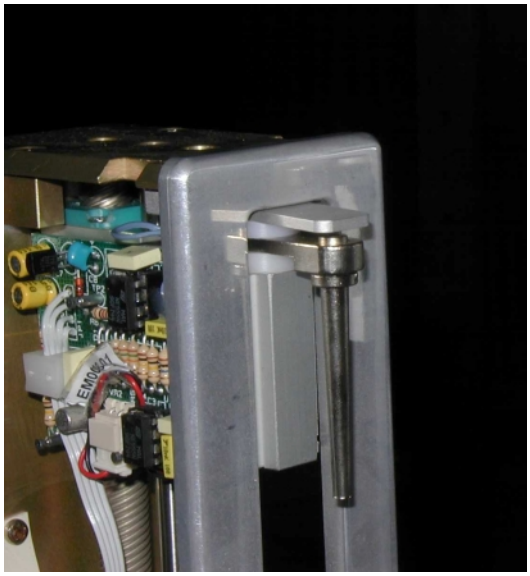
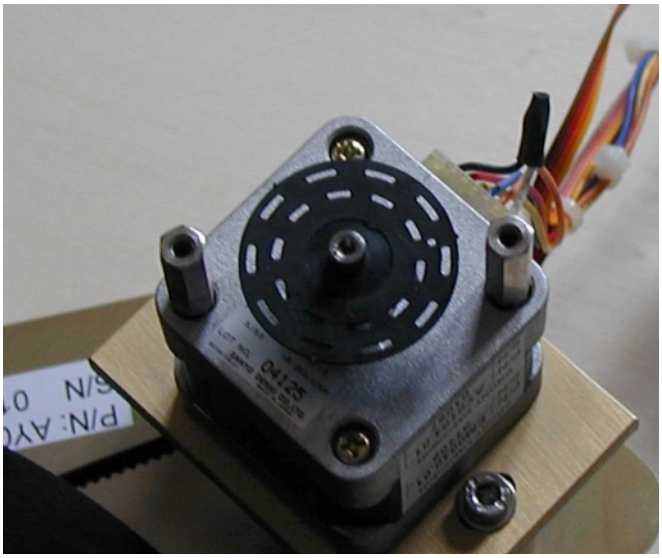
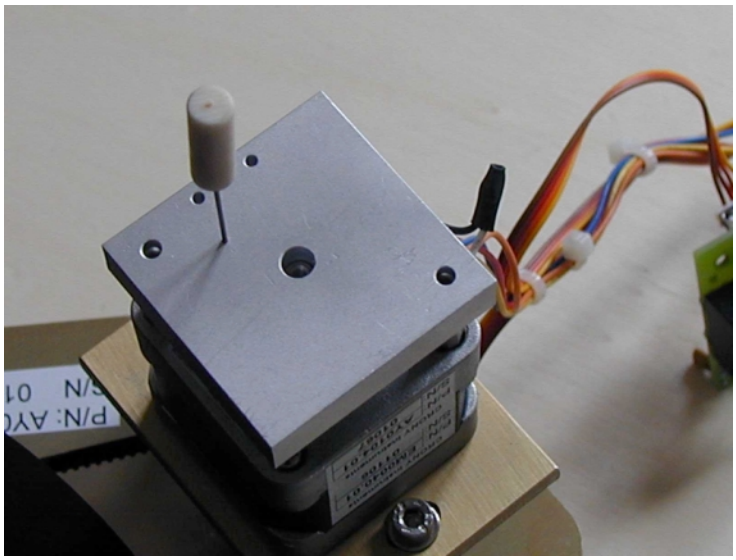


FIG.1F

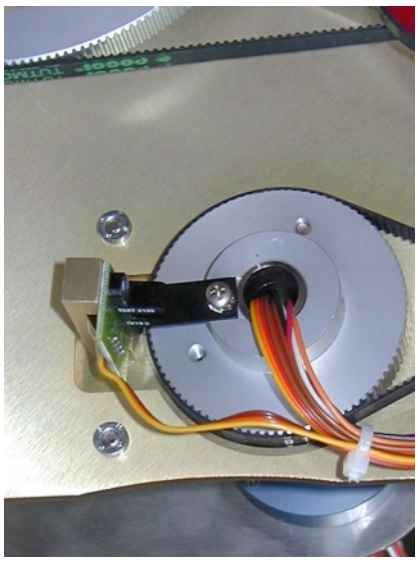






16 17 18 19 20

16 17 18 19 20 21



CUVETTE WASHING ARM

1. Remove the arm (1) from the cuvette washing system holder
2. Insert device D/4 in Fig.1G on the OPTO switch (2) and position the FLAG (3) by rotating the screw (4) until it touches the device D/4.
3. Remove from support (7) the probe (2) using the screw (10)
4. Insert the ARM (1) into its holder and adjust its height to 119 mm (use device D/9) in Fig.1G and lock loosely the screws (8) - (use hex key 2.5mm)
5. Insert adapter device D/2 into cuvette 1 in Fig. 1G.
6. Lower the ARM (by rotating the screw (4) manually) and align it perfectly to the center of the adapter.
7. Lock the screws (8) - (hex key 2.5mm) and screws (9) - (hex key 3mm) in Fig, 1G.
8. To center the second PROBE, raise the ARM and insert the adapter device D/2 into the cuvette 2.
9. Insert the PROBE 2 , lower the arm (7) and center the Probe perfectly over the adapter and lock the screws (10) - (using a Phillips screwdriver 5mm) Fig.1G.

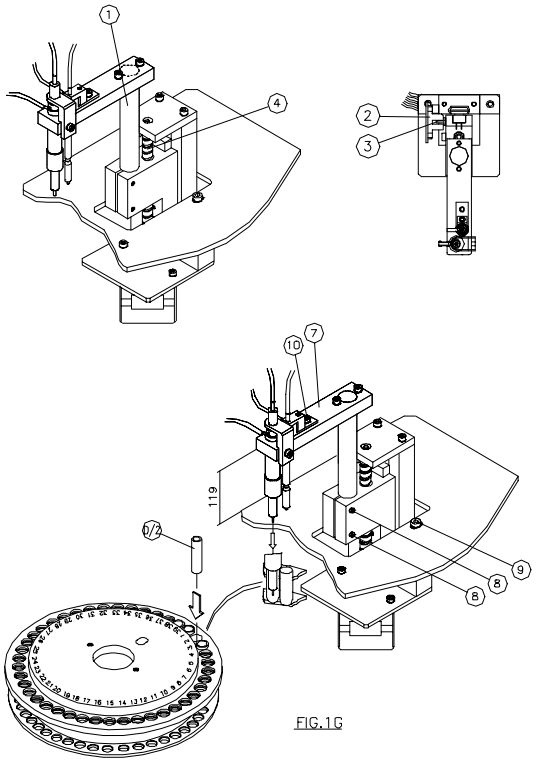
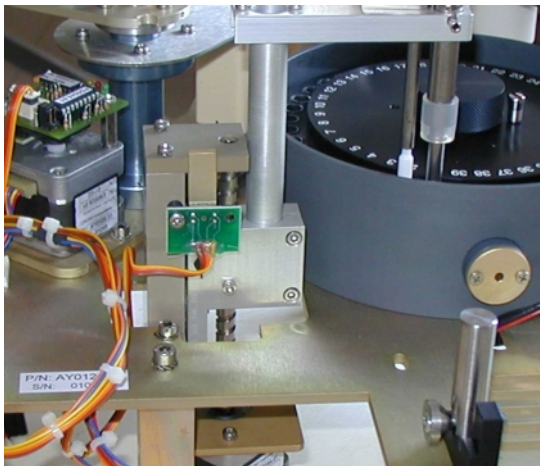
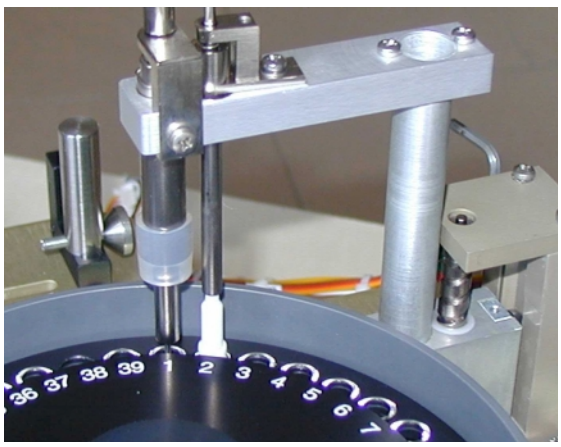


FIG.1G





PHOTOMETER

1. Stretch the belt (1) to have in its middle a deflection of about 2mm with 0.5 kg.
2. Lock the grub screw of the SYNC disk (7) in Fig.1H (hex key 2mm) in a way to have some friction on the disk.
3. Rotate the filter revolver (3) and place the FLAG HOME (4) in Fig. 1H to the center of the OPTO (5).
4. Hold still the filter revolver and rotate the SYNC disk until one of the two slits coincides with the center of the OPTO (6).
5. Lock the disk grub screw (7) - (hex key 2mm - make sure not to lock the screw too tightly because the support is made from PVC)

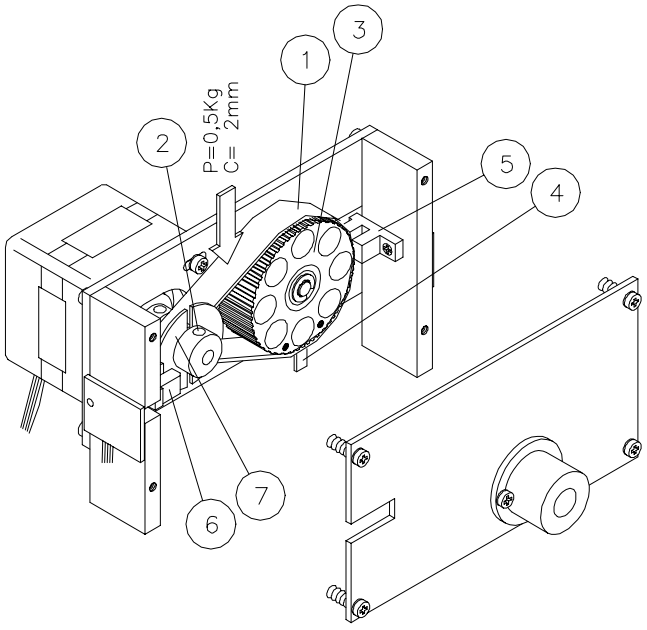


FIG.1H

SAMPLE TRAY

1. Remove the PCB of the encoder (1) and replace it with the device D/8 to align the SYNC.(5) in Fig. 1N.
2. Position the FLAG HOME in the center of the OPTO switch (4) in Fig. 1/N.
3. Rotate the SAMPLE ARM and position the PROBE into the center of sample 1.
4. Rotate the disk until the hole off the SYNC coincides perfectly with the hole of the alignment device D/8 in Fig. 1/N, replace the PCB of the encoder and lock it.

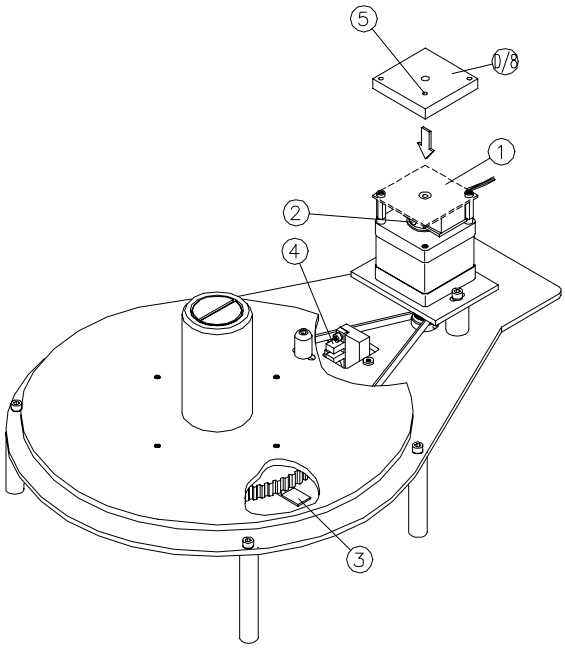


FIG. 1N

REAGENT PLATE

1. Remove the PCB of the encoder (1) and replace it with the device D/8 to align the SYNC. (2) in Fig. 1L.
2. Position the FLAG HOME (3) in the center of the OPTO switch (4)
3. Rotate the Reagent Arm and position the PROBE in the center of Reagent container 1.
4. Rotate the encoder disk (2) until the hole of the SYNC coincides perfectly with the hole of the reference device D/8. Lock the grub screw of the disk (2) - (hex key 1 -5mm - make sure not to tighten the screw too strong because the support is made from PVC).
5. Reinsert the PCB of the encoder (1) and lock it with screws (5).

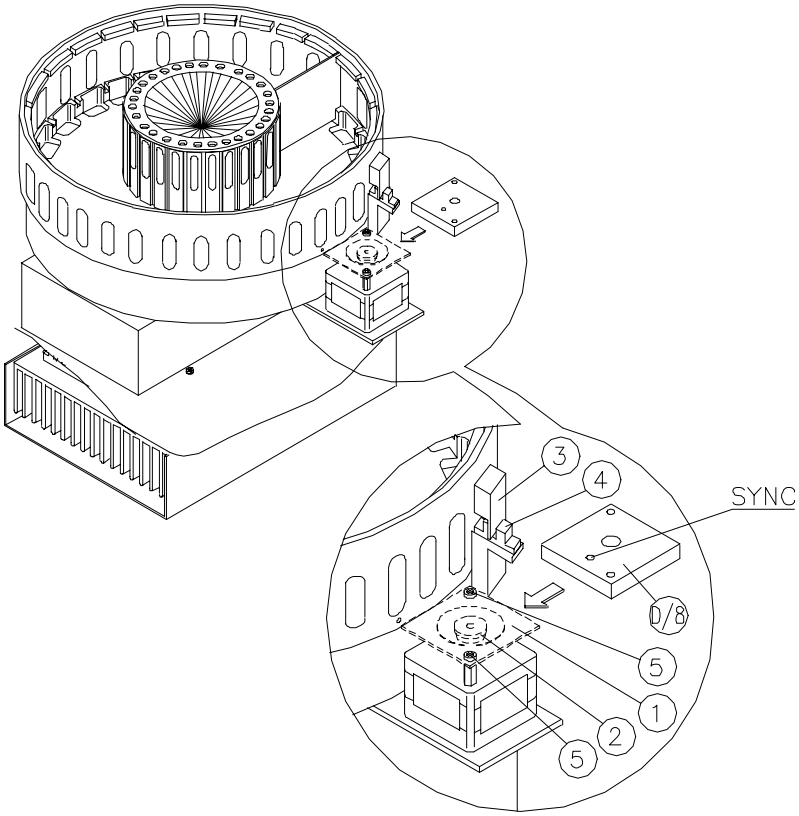
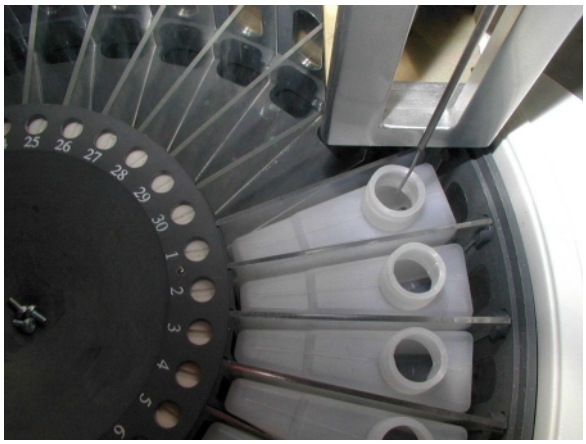
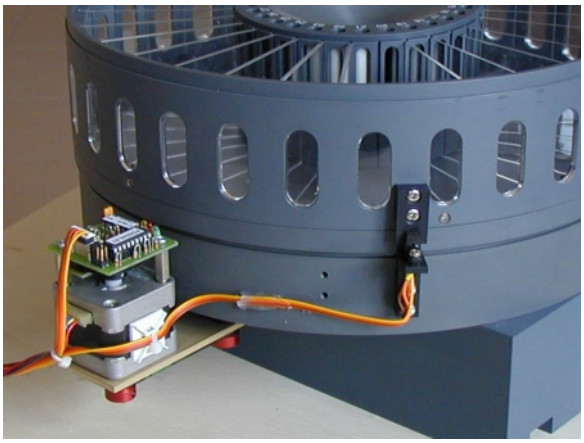


FIG. 1L





DILUTERS

1. Unscrew just a little the SYNC disk (1) in Fig. 1M so it can be moved
2. Verify that all the screws of the pulley (2 and 3) in Fig 1M are locked well. (hex key 2mm) and stretch the belt (7) by pulling the motor (8).
3. Insert the spacer device D/10 (29mm) between the female screw (9) and the upper support (4) in Fig. 1M and lock it by rotating the screw (5) manually.
4. Rotate the SYNC disk until the slit coincides perfectly with the center of the OPTO (10).
5. Lock well the screw of the disk (6) – (hex key 2mm - make sure not to tighten the screw too strong, because the support is made from PVC)

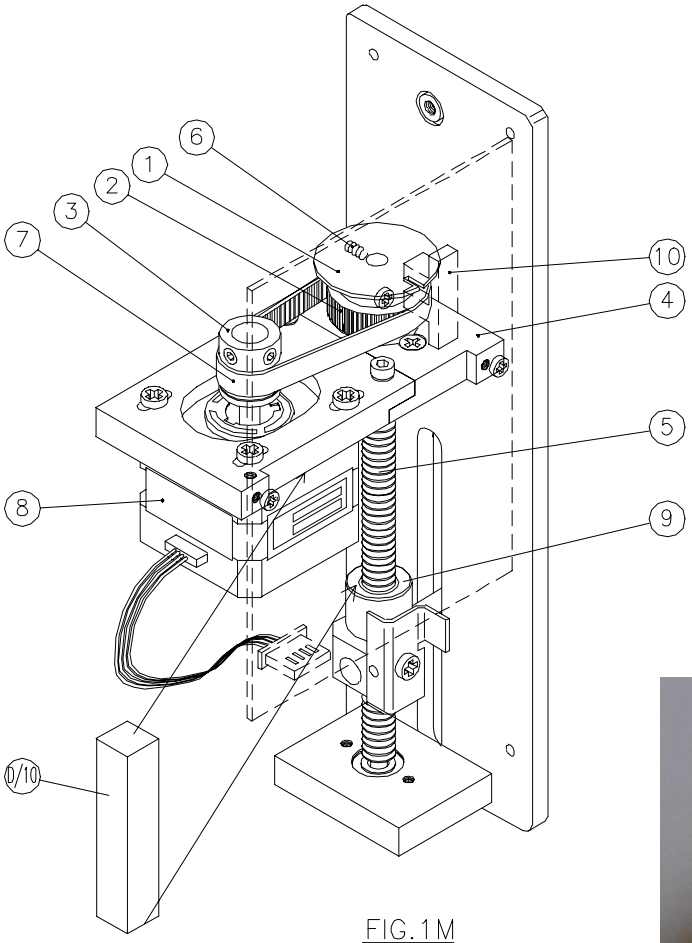


FIG. 1M

DEVICES REQUIRED

Tool Kit Cat.-No. 17970

D/1 - Cuvette extractor

D/2 – Device to center all Probes: Sample, Reagnt and cuvette washing probes)

D/3 - Spacer 2 mm to Home Sample and Reagent Arms

D/4 - Device to align HOME position for Reaction plate and cuvette-washing Arm .

D/5 - Alignment to center Probe

D/6 – Device to align Reaction Plate and Reagent Probes

D/7 - Probe declogger

D/8 - Alignment SYNC of Encoder disk

D/9 - Spacer to adjust the cuvette washing Arm

D/10 - Spacer to adjust HOME diluter

D/11 – Friction Device for pulley for reaction plate (with spring)

Addtionally required tools not provided with tool kit

D/12 - Hex Key - 1.5, 2, 2.5, 3 and 4 mm

D/13 - Hex Key - 2

D/14 - Hex Key - 2.5

D/15 - Hex Key – 3

D/16 - Hex Key - 4

D/17 - Tube hex key – CH 10

D/18 - Phillips screwdriver D= 5 mm

D/19 – Normal screwdriver D= 2.5 mm

D/20 - Normal screwdriver D= 7 mm

2. ELECTRONICAL ADJUSTMENTS

1. Power Supply Board Cat.-No. 17970/7 (EB0043.01)

1.1 Water Bath Temperature
This operation should be done at least 20 minutes after the analyzer has been turned ON. Dispense 500 ul of dist. water into one of the cuvettes in the reaction plate.

1.2 Introduce a thermometer into that cuvette and wait about 10 sec. before starting to read the temperature (use a thermometer with a small thermocouple not to distort the measurement). The incubation temperature should reach 37°C +/- 0.2°C

Note: the temperature displayed by the software in MAINTENANCE is about 3°C higher because it is measured inside the heater.

1.3 If the temperature needs to be adjusted the heater can be adjusted by means of potentiometer PR26. 1 complete rotation cw = + 1°C.

1.4 The reference voltage has to be +5V at testpoint TP5 and can be adjusted by means of PR47.

1.5 Reagent Cooling Temperature
The reagent cooling is not controlled by any sensor. The cooling is sufficient to reduce the temperature of the reagent to about 12°C below room temperature.

1.6 The maximum cooling effect can be adjusted by means of PR48.

2. DC/DC Converter for Lamp Cat.-No. 17970/10 (EB0054.01)

2.1 Adjust with PR1 11V to be measured at TP3 (or lamp connector J2).

3. Motor Driver Boards

17970/20	EB0092.02
17970/21	EB0092.03
17970/22	EB0092.04
17970/23	EB0092.05

All the above boards have 2 different currents: Low Power (hold) and Working Power (move). To make the adjustment the board has to be connected to an extender cable.

All measurements are made at TP3 against GND.

3.1 17970/20 adjust by means of PR2 (low power) to 400mV, PR1 (work) to 800mV
3.2 17970/21 adjust by means of PR2 (low power) to 215mV, PR1 (work) to 800mV
3.3 17970/22 adjust by means of PR2 (low power) to 100mV, PR1 (work) to 400mV
3.4 17970/23 adjust by means of PR2 (low power) to 100mV, PR1 (work) to 800mV

4. ADC Converter Cat.-No. 17970/19 (EB0089.01)

4.1 Be sure the water bath is filled and fill cuvette # 38 with 600 µl distilled water.

4.2 With the help of the service program TESTER move filter 340 nm into the reading position.
On the ADC board one should measure +0.8 to 1.3 V at TP2
If this range is not reached please check these points:
a) No water in water bath or cuvette
b) Cuvette tray not correctly adjusted
c) Lamp aged or burned
d) Filter dirty or aged
e) Optical detector defect

4.3 Check whether +4.2 to 4.5 V are available on TP3. If not adjust to this range with PR1 (Gain).

5. Peristaltic Pump Driver Board

17970/4	EB0033.01
17970/5	EB0033.02
17970/6	EB0033.03

5.1 Pump P1 & P2
In reference to TP1 adjust the voltage to 800mV with PR1.

5.2 Pump P4
In reference to TP2 adjust the clock to 66.0 Hz with PR2.
In reference to TP1 adjust the voltage to 500mV with PR1.

5.3 Pump P5
In reference to TP2 adjust the clock to 1.0 KHz with PR2.
In reference to TP1 adjust the voltage to 500mV with PR1.

3. OPERATIONS TO BE DONE WITH ANALYZER TURNED ON

1. Filling the HYDRAULIC SYSTEM
2. Filling the incubation bath chamber
3. Lamp alignment
4. Check all module alignment
5. Check peristaltic pumps
6. Check diluters

4. UTILITY AND DIAGNOSTIC DISKETTE

(To use the this program the PC has to be ON)

1) Turn ON the analyzer. When the display window appears - press and hold CTRL key
2) Insert the **Utility Diskette** and proceed to the Menu **"My Computer" ;** Select floppy **"A".**
3) The diskette offers the following programs:
   a) **PrintMeth**.exe
      - extracts the Methods from DB and copies them into the file methods.txt
   b) **Satsmith**.exe
      - to enable and disable the **autorun**, **shutdown** and to **modify the password,** set the **level sensor** sensitivity, select the liquid for blank and change the **HOST baud rate**
   c) **SaveDBChem.exe**
      - serves to save and to reinstall the methodologies - **run from floppy disk only**
   d) **Tester.**exe
      - diagnostic TESTER software
   e) **Testlook**.exe
      - special tool to reset the TESTCOUNTER and close reagent tray positions and method settings – **run from floppy disk only**

5. TROUBLESHOOTING GUIDE

5.1 ANALYZER DOES NOT TURN ON

a) Make sure the power cord is inserted
b) Verify if there is power
c) Unplug the power cord and check the fuses

5.2 FUSES BLOW EASILY

a) Unplug all the connectors from the power supply PCB, replace the fuses and turn ON the analyzer
b) If the **fuses** continue to **blow** – replace the power supply
c) If the **fuses do not blow** - check all the voltages on the power supply PCB. If they are correct – insert the connectors one by one in order to isolate the defective part.

5.3 THE PC GROUP

5.3.1 THE COMPUTER DOES NOT TURN ON

a) Make sure there is power on the power supply
b) Check if the fan is turning
c) Check the following

5.3.2 THERE IS NO POWER

a) Check the fuse
b) Make sure there is power

5.4 PHOTOMETER

5.4.1 THE PHOTOMETER LAMP IS OFF

a) If computer and instrument are ON – change Lamp
b) Before changing the lamp – check the output voltage from power supply (11 Volt)

5.5 INCUBATION BATH

5.5.1 THE BATH THERMOSTAT IS NOT HEATING

a) Check if there is voltage on its connector
b) Check the continuity of the heating element (about 40 Ohm)
c) Check if there is voltage on the control pin of the Opto switch

5.5.2 THE BATH THERMOSTAT IS OVER HEATING

a) Verify the operating circuit that controls the temperature
b) Check the O-ring holding the thermometer inside the thermostat

5.5.3 LIQUID INSIDE THE INCUBATION CHAMBER IS NOT CIRCULATING

a) Make sure that pump “P6” is working properly
b) Check the recycling valve “V4”

5.5.4 THE WASTE DEVICE DOES NOT EMPTY

a) Make sure that pump “P7” is working properly
b) Check the pump tubing

5.5.5 PUMP “P1” DOES NOT WORK (Sample)

a) Make sure the rotor is not blocked
b) Check the fuse

5.6 RESULTS

5.6.1 NON REPRODUCIBLE RESULTS

a) Make sure that the liquid inside the bath is clean, empty and refill with clean
b) Check all tubing connections (Sampling probes, Cuvette washing probes, peristaltic pumps, syringes)
c) Check the syringe pistons “D1 and D2” and their O-rings and make sure all is tightly held
d) Check the connections and the tubing in pumps P1 and P2
e) Check – if necessary change the photometer lamp
f) Check reagent and sample volumes and the method used
g) Make sure that the Reagent 1 volume is at least 300 µl
h) Make sure to use fresh reagents
i) Make sure that the reagent containers are clean
j) Do not add fresh Enzyme Reagent into the old one
k) Make sure to use fresh WASH SOLUTION (that washes the sampling probes and the cuvettes)
l) Make sure that the probe mixers are working properly

5.6.2 BAD LINEARITY

a) Check the lamp alignment
b) Make sure that the signal output from the pre-amplifier is correct
c) Check volumes of Sample and Reagent for that method

5.6.3 RESULTS OBTAINED ARE TOO HIGH

a) Re-standardize and /or re-calibrate all your methods
b) Check the parameters of your methods
c) Old standards or calibrators – get new ones
d) Check the factors

5.6.4 RESULTS OBTAINED ARE TOO LOW

a) See the ABOVE IN 3.
b) Check the temperature in the incubation bath
c) Make sure your reagents and standards are fresh
d) Re-standardize the method

5.6.5 SERUM CONTROLS ARE NOT WITHIN EXPECTED RANGE

a) Check controls for expiration date and correct lot number
b) Check method, it may have been inadvertently reprogrammed
c) Make sure that method conforms with reagent suppliers specifications
d) Make sure the controls are not deteriorated
e) Re-assay by an alternative system, method or different reagent
f) If substrates – recommend to re-standardize analyzer using fresh primary standards or calibrators
g) Dirty solution in the incubation bath – exchange solution
h) Make sure that the incubation bath is at 37°C
i) If enzyme kinetics - check FACTOR and make sure that it corresponds to the reagent suppliers' specifications.

5.6.6 CONTAMINATION

a) Make sure to use fresh WASH solution
b) Missing WASH solution
c) Old WASH solution with deposits
d) Make sure no drops are hanging on the bottom of the Sample Probe when going to aspirate the sample or after
e) Make sure there no drops are hanging on the Reagent Probe after reagent aspiration or dispensing
f) Make sure that the two probes that wash the cuvettes work properly (go all the way down - dispense and aspirate correctly)
g) Make sure that the cuvettes are clean. Suggest to wash them with a biological glass detergent used in the laboratory.
h) Check the cuvettes after a washing cycle and make sure that they are dried properly. To do so, use a micropipette with a thin tip and aspirate from the bottom; there should be no liquid
i) If running many turbidity tests – suggest to wash the cuvettes right afterwards with a mild acidic solution or any other solution that cleans the turbidity from the cuvettes. Also the cuvette washing is very effective (see special note below)

5.6.7 DRIFT

a) Check the stability of the photometer lamp
b) Change photometer lamp
c) Check stability of the incubation bath
d) Make sure the reagents are fresh

5.6.8 LIQUID DROPS ON THE TIP OF THE PROBE

a) Make sure that all connections to the Probes are really tight
b) Check both syringe pistons and their O-rings
c) Check the connections of the peristaltic pumps “P1and P2”
d) Make sure that the air scrub inside the Probe cleaner works properly

5.7 MIXERS

a) Check the voltage on the motor
b) Make sure that the connecting rod moves correctly by rotating the cam with a screwdriver
c) Make sure that the motor resistance is (about 10 Ohm) when disconnecting it from the PCB

5.8 PRINTER

5.8.1 Printer does not TURN ON

a) Make sure that the power cord is plugged in
b) Check the ON/OFF switch
c) Check the fuse

5.8.2 Printer does not Print ON-LINE

a) Make sure the printer is set ON-LINE
b) Make sure the Check Box in **Options** is **enabled** to print on-line
c) Check Printer cable connection

5.8.3 Printer does not Print Patient Reports or Other Print-Outs

a) Make sure that the Check Box in **Options** is **disabled** to print On-Line
b) Make sure it is connected to the analyzer

5.9 DILUTER

5.9.1 Diluter Module Stops

a) Check with TEST the Diluter
b) Try to lubricate the screw with very thin oil
c) Change Syringe

5.9.2 Diluter does nor Aspirate or Dispense

a) Squeezed or torn Syringe Tubing
b) Loose or badly connected Probe
c) Blocked Probe - clean
d) Wash Solution Container Empty – check

5.10 LEVEL SENSORS

5.10.1. Level Sensor too Sensitive

a) Probe stops above the liquid (Reagent container or sample cup) and does not go down to aspirate.
b) Check sensitivity program and adjust accordingly

5.10.2. Level Sensor not Sensitive enough

a) The Probe goes down into the liquid without sensing the liquid
b) Check sensitivity program and adjust accordingly

5.10.3 Broken Contact between the Probe and its PCB

a) The Probe goes all the way down into the liquid (Reagent or Sample) and gives error – NO Reagent or Sample
b) Make sure that the connection between the PBC and the Probe is good

5.10.4 Bad isolation between the Probe and the mixer motor

a) Probe goes down and stops above the liquid without further going down
b) Make sure there is an isolation O-ring between the probe holder and the mixer motor

6. HOW TO USE THE DIAGNOSTIC TESTER

The Hardware architecture of the ANALYZER is controlled by a Master Hardware (PC) and 3 slave Microprocessors. Each of these Microprocessors controls one of the robotic systems, as follows:

1) **Reagent System**
2) **Sample System**
3) **Reaction System and cuvette washing**

Reagent System

The following diagnostic tests can be executed as shown in Fig tester1.bmp

Home Z – axis
Movement Z – axis
Test Z
Home Plate
Test Plate
Home Reagent Arm
Rotation Reagent Arm
Test Reagent Arm
Home Diluter
Diluter Movement
Test Diluter
Air Pump
Pump P4
Pump P2
Mixer
Level Sensor
Bar Code Reader (Optional)

Sample System

The following diagnostic tests can be executed as shown in Fig. tester1.bmp

Home Z – axis
Movement Z – axis
Test Z
Home Sample Tray
Test Tray
Home Sample Arm
Rotation Sample Arm
Test Sample Arm
Home Diluter
Diluter Movement
Test Diluter
Air Pump
Pump P4
Pump P1
Mixer
Level Sensor
Bar Code Reader (Optional)

Reaction System

The following diagnostic tests can be made as shown in Fig. tester1.bmp

Cuvette Washing System
Home Z – axis
Movement Z - axis
Test Z – axis
Cuvettes
Home Plate
Rotation Plate
Test Plate
Home filter Revolver
Rotation Filter Revolver
Test Filters
Air Pump
Valve V4
Valve V5
Pump P3
Pump P5
Pump P6
Pump P7
Pump P8
Thermostat Temperature
Check AUX sensor
Check Waste Sensor
Test Photometer
Test ISE (optional)
Level Test

Lamp Alignment

1. First of all make sure that the measurement plate is correctly adjusted as outlined in the section Mechanical Adjustments and the optical unit is mounted well.
2. Switch on instrument
3. Wait for Bios power on self test
4. As soon as Windows starts press the “CTRL” key down until the Windows desktop appears. Hold it down till Windows has been completely loaded.
5. Insert floppy disk with “TESTER.EXE” and run it.
6. With reference to picture “tester0.bmp”, the screen is divided in 3 areas “Reagents”, “Cuvettes”, “Samples”. For this alignment we will use the central area, that is “Cuvettes”. Every time a button is pressed, the “Cuvette” sign will go from black to red. It will become black again as soon as the requested operation is completed.
7. Press “Cuvettes” **Pwr On**, wait till operation is completed.
8. Press “Cuvettes” **Home Z**, wait till operation is completed.
9. Press “Cuvettes” **Home Plate**, wait till operation is completed.
10. Press “Cuvettes” **Home Filter**, wait till operation is completed.
11. Check Thermal Bath level pressing “Cuvettes” **Levels**, if both “TB Low” and “TB High” are green then proceed to next; if not press “Cuvettes” **TB Fill**, wait till operation is completed. Repeat this step until the thermal bath is ok.
12. With reference to picture “plate0.jpg”, if cuvette 38 is not in front of the photometer, slowly move it (manually) to position it in front of the photometer then fill cuvette 38 with 500 uL of distilled water.
13. Press “Cuvettes” **Fotometer**, a new window appears (picture “tester2.bmp”).
14. Press “Cuvettes” **Water B**, (picture “tester3.bmp”), wait till operation is completed. At the end of this operation the water blank readings will be shown in the Water B. column.
15. Select “Cuvettes” **Filter 1**, (picture “tester4.bmp”).
16. Press “Cuvettes” **Move Filter**, wait till operation is completed.
17. Check the check box on the right of “Cuvettes” **Read One**, (picture “tester5.bmp”) to enable continuos photometer reading.
18. Press “Cuvettes” **Read One**, from now on, the cuvette 38 is read continuosly with filter 1, and readings are shown in the Readings column (picture “tester6.bmp”).
19. Adjust the lamp until you get the maximum reading.
20. De-check the check box on the right of “Cuvettes” **Read One**, (picture “tester4.bmp”) to disable continuous photometer reading.
21. Repeat steps 14, 15, 16.
22. Press “Cuvettes” **Read One**, then read and store the mAbs.
23. Press “Cuvettes” **Home Plate**, wait till operation is completed.
24. Repeat steps 14, 15, 16.
25. Press “Cuvettes” **Read One**, then read and compare the mAbs with values previously stored. If read value is within ± 25 mAbs, then procedure is completed, if not, start it up again.

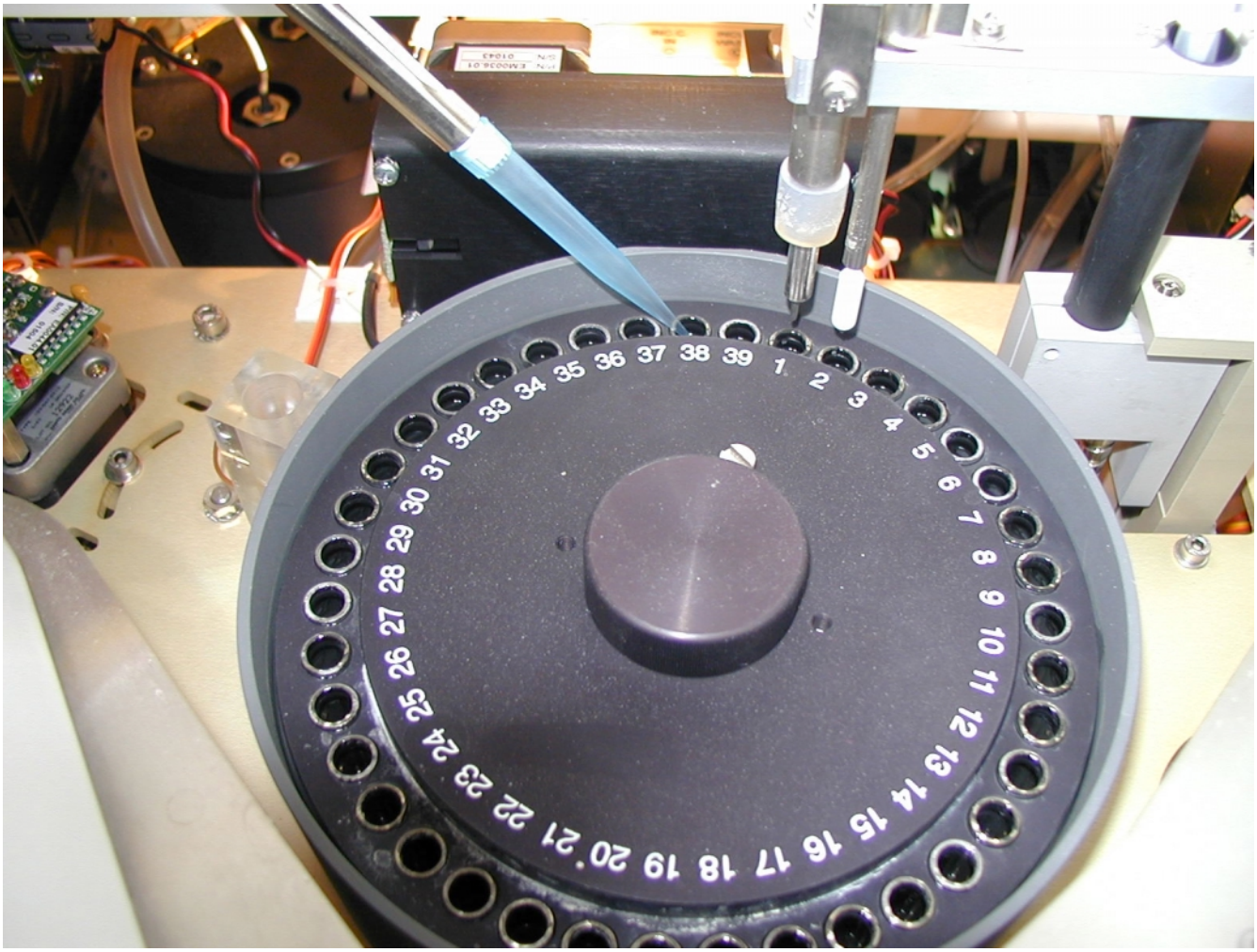
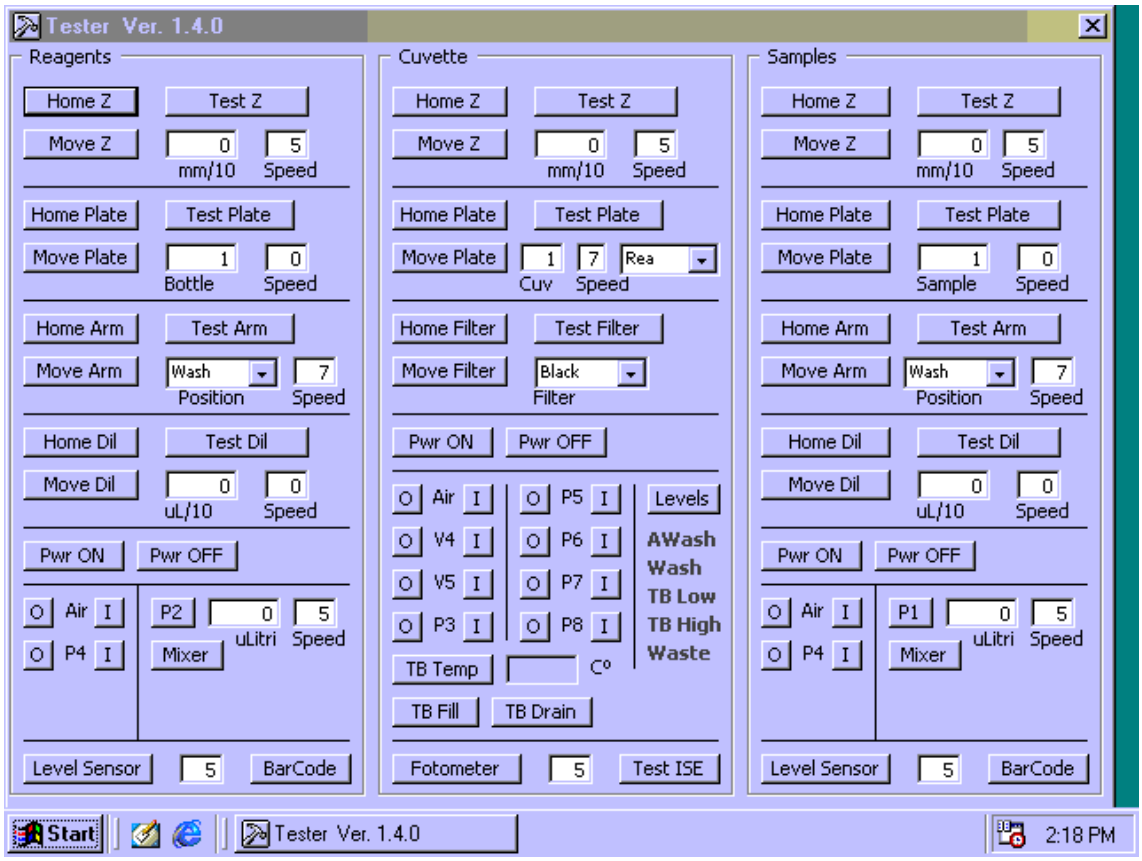
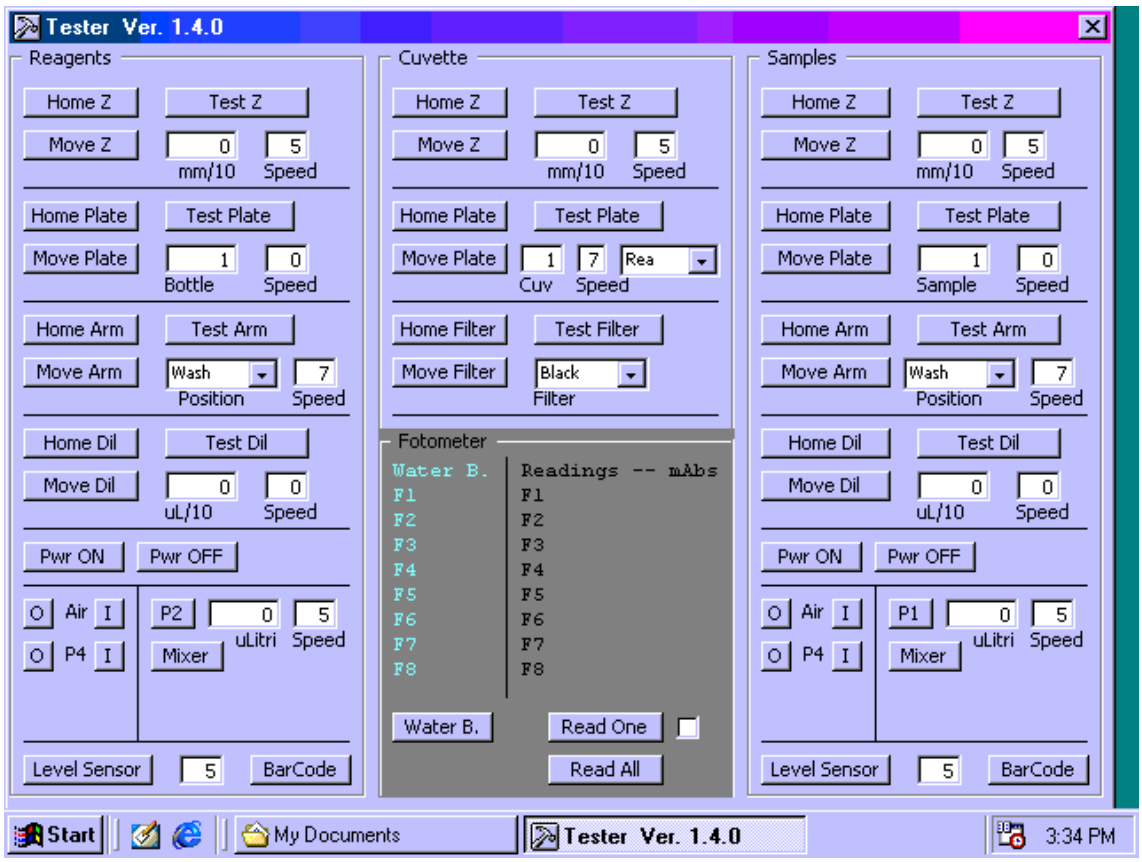

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

plate0.jpg

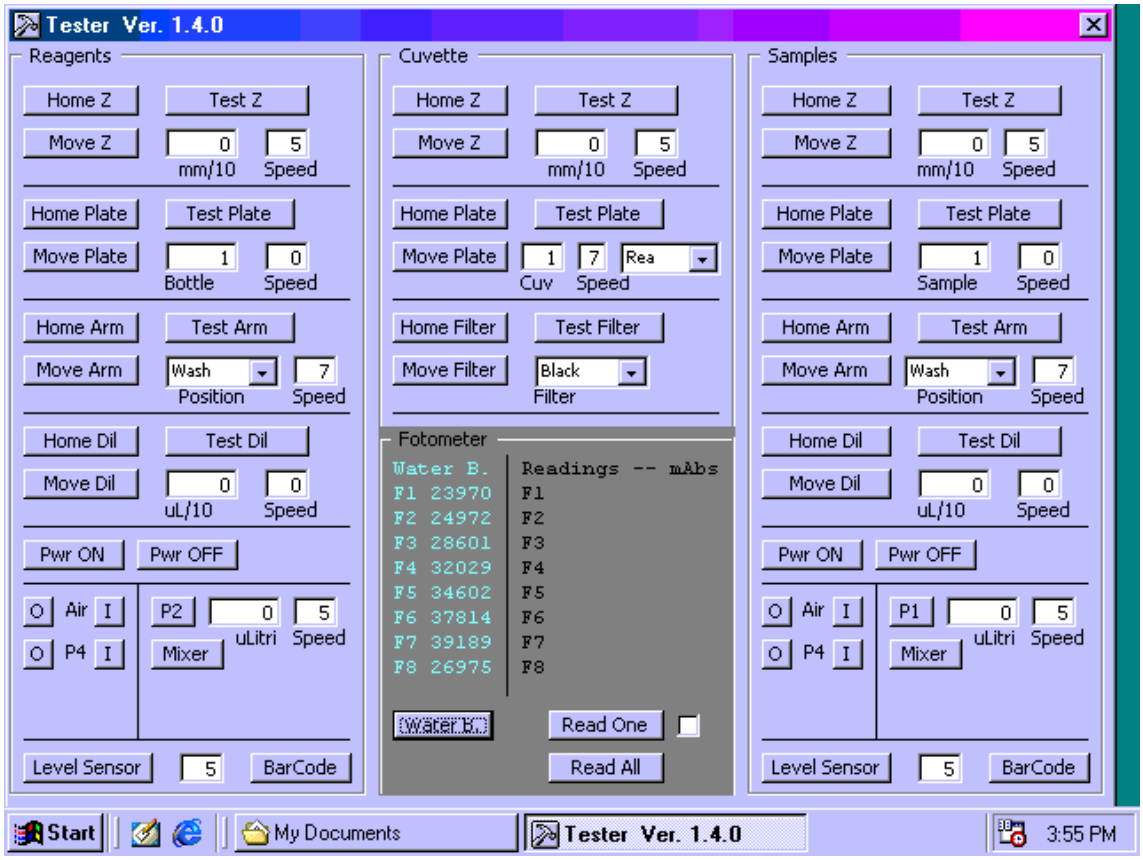
tester1.bmp



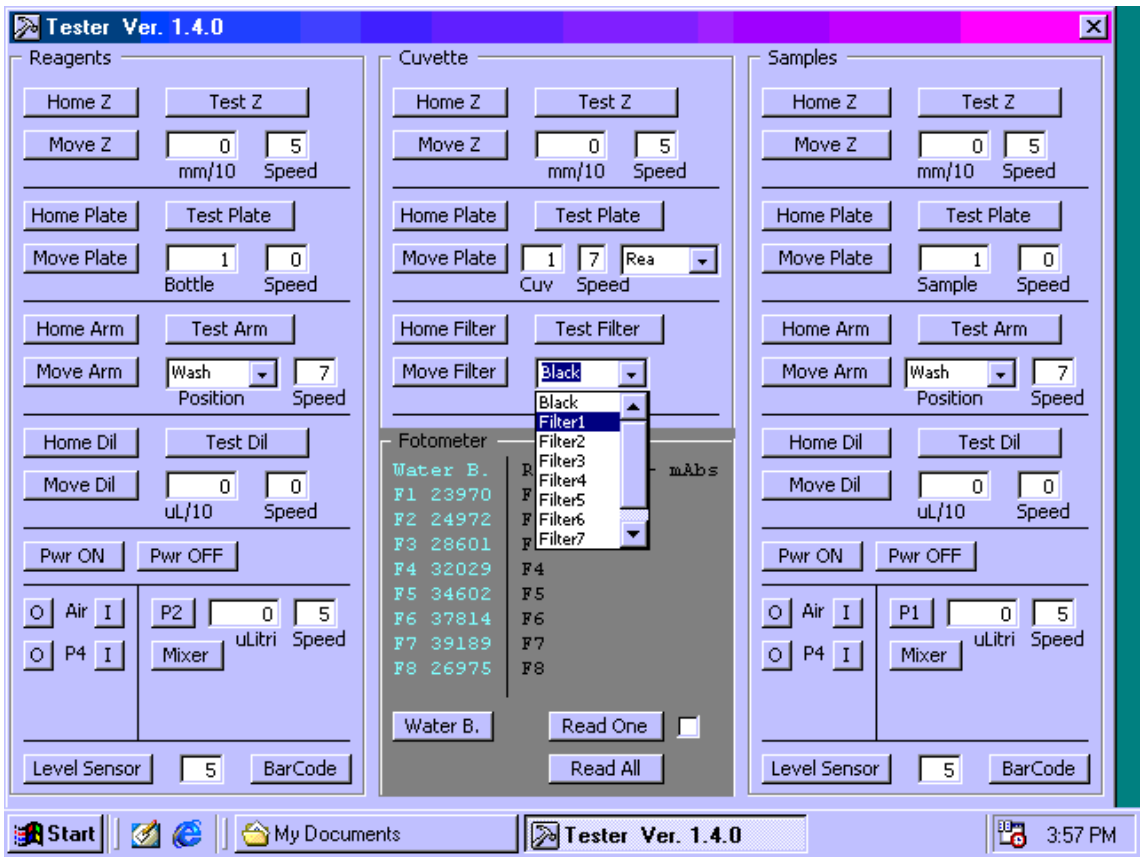
tester2.bmp



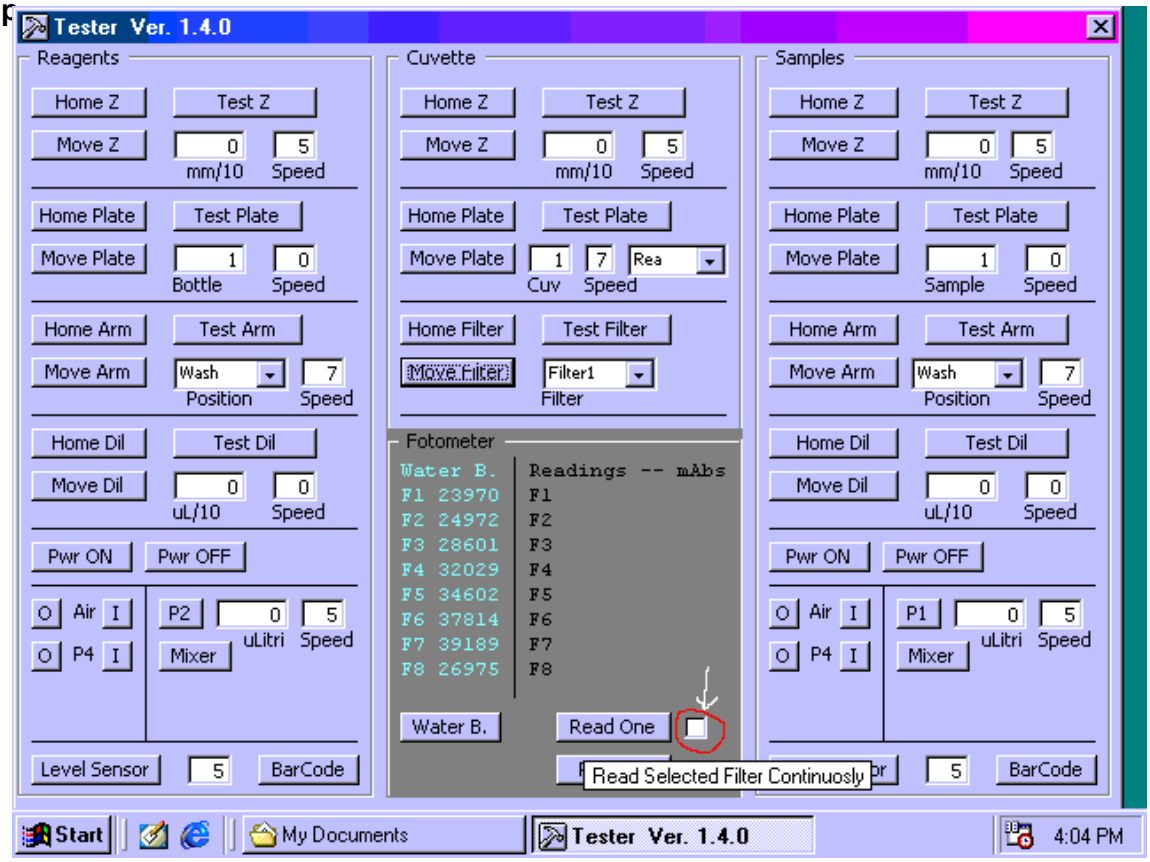
tester3.bmp



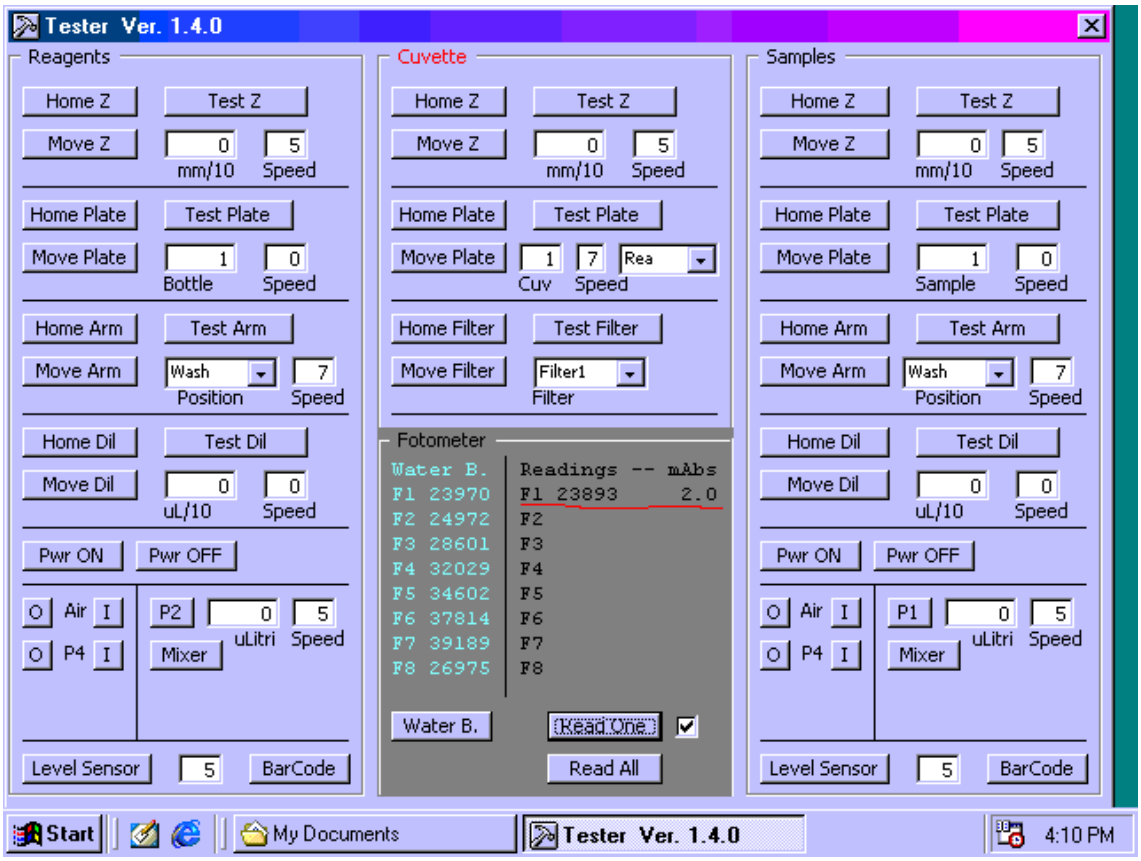
tester4.bmp



tester5.bmp



tester6.bmp



NOTE:

All technical diagrams are available in hardcopy only. To order the complete service manual REF 17901S/2 kindly contact human@human.de.

Human
Gesellschaft für Biochemica
und Diagnostica mbH
Max-Planck-Ring 21 • D-65205 Wiesbaden
Germany
Telefon: +49 6122 9988 0
Telefax: +49 6122 9988 100

eMail: human@human.de
Internet: http://www.human.de

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